Energy Conversion and Management

an International Journal

Volume 39 1998

List of Contents and Author Index

Pergamon

ENERGY CONVERSION AND MANAGEMENT

Editor-in-Chief

DR JESSE C. DENTON
P.O. Box 355, Belton, TX 76513, U.S.A.

Editorial Assistant ELIZABETH DENTON

Regional Editors

PROFESSOR NOAM LIOR
212 Towne Building
University of Pennsylvania
Philadelphia, PA 19104-6315, U.S.A.

PROFESSOR EMERITUS TOKIO OHTA
Yokohama National University
4-8-15 Inamuragasaki
Kamakura, Japan 248

Editorial Board

PROFESSOR ANTOINE ALEMANY
Laboratory LEGI
BP 53
38041 Grenoble Cedex
France

DR KARL W. BOER
Materials Science
102 Spencer Laboratory
University of Delaware
Newark, DE 19716, U.S.A.

PROFESSOR GEORGE TSATSARONIS
Institute of Energy Engineering
Technische Universität Berlin
Marchstr. 18, 10587
Berlin, Germany

PROFESSOR A. JOHN APPLEBY
Director, Center for
Electrochemical Systems
& Hydrogen Research
238 Wisenbaker Engineering
Research Center
The Texas A&M University
System, College Station
TX 77843-3042, U.S.A.

PROFESSOR R. W. J. KOUFFELD
Faculty of Mechanical Engineering
and Marine Technology
Mekelweg 2, P.O. Box 5037
2600 GA Delft
The Netherlands

PROFESSOR CHIH WU
Mechanical Engineering
Department
U.S. Naval Academy
Annapolis
MD 21402-5042, U.S.A.

Publishing Office: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K. [Tel.: (+44) 1865 843000; Fax: (+44) 1865 843010]. North America: Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

Frequency: Published 18 times per year

Advertising information: Advertising orders and enquiries can be sent to:

Europe and ROW: Rachel Gresle-Farthing, Elsevier Science Ltd., Advertising Department, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K.; phone: (+44) (1865) 843565; fax: (+44) (1865) 843976; e-mail: r.gresle-farthing@elsevier.co.uk.

U.S.A. and Canada: Elsevier Science Inc., Mr Tino DeCarlo, 655 Avenue of the Americas, New York, NY 10010-5107, U.S.A.; phone: (+1) (212) 633 3815; fax: (+1) (212) 633 3820; e-mail: t.decarlo@elsevier.com.

Japan: Elsevier Science K.K., Advertising Department, 9-15 Higashi-Azabu 1-chome, Minato-ku, Tokyo 106, Japan; phone: (+81) (3) 5561 5033; fax: (+81) (3) 5561 5047.

Back Issues: Back issues of all previously published volumes are available direct from Elsevier Science Offices (Oxford and New York). Complete volumes and single issues can be purchased for 1994–1998. Earlier issues are available in high quality photo-duplicated copies as complete volumes only.

Periodicals postage paid at Rahway, NJ and additional entry points. *Energy Conversion and Management* (ISSN 0196-8904) is published monthly, January to December plus additional issues in January, March, May, July, September and November by Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K. The annual subscription in the U.S.A. is $2252. *Energy Conversion and Management* is distributed by Mercury Airfreight International Ltd, 10 Camptown Road, Irvington, NJ 07111-1105. POSTMASTER: please send address corrections to *Energy Conversion and Management*, c/o Elsevier Science Regional Sales Office, Customer Support Department, 655 Avenue of the Americas, New York, NY 10010, U.S.A.

CONTENTS OF VOLUME 39

Number 1/2

M. Muselli, G. Notton, J. L. Canaletti and A. Louche	1	Utilization of Meteosat satellite-derived radiation data for integration of autonomous photovoltaic solar energy systems in remote areas
Thomachan A. Kattakayam and K. Srinivasan	21	Uninterrupted power supply for autonomous small refrigerators
M. Torjman and H. Shaaban	27	Nuclear energy as a primary source for a clean hydrogen energy system
Ching-Yang Cheng and Cha'o-Kuang Chen	33	Ecological optimization of an endoreversible Brayton cycle
Lingen Chen, Chih Wu and Fengrui Sun	45	Influence of internal heat leak on the performance of refrigerators
Parm Pal Singh, B. S. Ghuman and N. S. Grewal	51	Computer model for performance prediction and optimization of unheated biogas plant
D. A. Haralambopoulos and G. F. Paparsenos	65	Assessing the thermal insulation of old buildings—the need for *in situ* spot measurements of thermal resistance and planar infrared thermography
N. J. Lamfon, Y. S. H. Najjar and M. Akyurt	81	Modeling and simulation of combined gas turbine engine and heat pipe system for waste heat recovery and utilization
Ahmed Hamza H. Ali, H. Saito, I. M. S. Taha, K. Kishinami and I. M. Ismail	87	Effect of aging, thickness and color on both the radiative properties of polyethylene films and performance of the nocturnal cooling unit
A. Satheesh Kumar, Bhumesh Gupta and D. P. Tewari	95	Electrothermal instabilities in MHD boundary layers
Ali A. Badran and Mohammed A. Hamdan	105	Utilization of solar energy for heating fuel oil
Lingen Chen, Chih Wu and Fengrui Sun	113	Optimization of specific rate of heat pumping in combined heat pump cycles
Lingen Chen, Chih Wu and Fengrui Sun	117	Cooling load versus COP characteristics for an irreversible air refrigeration cycle
S. C. Saxena	127	Fluidized-bed incineration of solid pellets: combustion and co-combustion
Chih Wu, Lingen Chen, Fengrui Sun and Shui Cao	143	Optimal collector temperature for solar-driven heat pumps

Number 3/4

LINGEN CHEN, FENGRUI SUN and CHIH WU	149	Optimal expansion of heated working fluid with phenomenological heat transfer
YAHYA H. KHRAISHA	157	Kinetics of isothermal pyrolysis of Jordan oil shales
M. TIRIS and C. TIRIS	167	Optimum collector slope and model evaluation: case study for Gebze, Turkey
G. N. TIWARI and SANGEETA SUNEJA	173	Performance evaluation of an inverted absorber solar still
S. K. CHATURVEDI, D. T. CHEN and A. KHEIREDDINE	181	Thermal performance of a variable capacity direct expansion solar-assisted heat pump
R. K. GOYAL, G. N. TIWARI and H. P. GARG	193	Effect of thermal storage on the performance of an air collector: a periodic analysis
SANTOSH RANA, RAM CHANDRA, S. P. SINGH and M. S. SODHA	203	Optimal mix of renewable energy resources to meet the electrical energy demand in villages of Madhya Pradesh
G. BISIO	217	A second-law analysis of the "hot blast stove/gas turbine" combination by applying the parameter "usable exergy"
G. BISIO	229	Thermodynamic analysis of the main devices for thermal energy upgrading
G. WEIR and T. MUNEER	243	Energy and environmental impact analysis of double-glazed windows
N. ABODAHAB and T. MUNEER	257	Free convection analysis of a window cavity and its longitudinal temperature profile
M. HAMMAD, Y. ZURIGAT, S. KHZAI, Z. HAMMAD and O. MOBYDEEN	269	Fluidized bed combustion unit for oil shale
ADNAN SHARIAH, BASSAM SHALABI, AKRAM ROUSAN and BRHAN TASHTOUSH	273	Effects of absorptance of external surfaces on heating and cooling loads of residential buildings in Jordan
E. H. AMER, P. JADEJA, J. K. NAYAK and G. K. SHARMA	285	Comparison of two dynamic test methods for solar flat-plate collectors
LI XINGUO	295	Thermal performance and energy saving effect of water-loop heat pump systems with geothermal
T. MUNEER, M. GUL and H. KAMBEZEDIS	303	Evaluation of an all-sky meteorological radiation model against long-term measured hourly data

M. Costa, D. Buddhi and A. Oliva — 319 Numerical simulation of a latent heat thermal energy storage system with enhanced heat conduction

Cengiz Yildiz, Yaşar Biçer and Dursun Pehlivan — 331 Effect of twisted strips on heat transfer and pressure drop in heat exchangers

Lingen Chen, Junxing Lin, Fengrui Sun and Chih Wu — 337 Efficiency of an Atkinson engine at maximum power density

Stig-Inge Gustafsson — 343 Carpentry factory and municipal electricity loads

M. Chaabene and M. Annabi — 349 Dynamic thermal model for predicting solar plant adequate energy management

Number 5/6

Da-Wen Sun — 357 Comparison of the performances of NH_3–H_2O, NH_3–$LiNO_3$ and NH_3–NaSCN absorption refrigeration systems

Yasuhiko H. Mori — 369 Formation of CO_2 hydrate on the surface of liquid CO_2 droplets in water—some comments on a previous paper

Dmitry V. Paramonov and Mohamed S. El-Genk — 375 Effect of oxygen on the operation of a planar thermionic converter for isothermal and isoflux heating conditions

Keith W. Lindler and Mark J. Harper — 391 Combustor/emitter design tool for a thermophotovoltaic energy converter

A. Dadone, L. Dambrosio and B. Fortunato — 399 One step ahead adaptive control technique for wind systems

Mohammed A. Hamdan — 415 Investigation of an inexpensive solar collector storage system

X. K. Kakatsios and G. E. Houzouris — 421 Analytical study and empirical relations for the oblique and normal shock-waves in real air

S. Sinha, Sanjay Kumar and N. Kumar — 437 Energy conservation in high-rise buildings: changes in air conditioning load induced by vertical temperature and humidity profile in Delhi

Sanjay Kumar, S. Sinha and N. Kumar — 441 Experimental investigation of solar chimney assisted bioclimatic architecture

Chih Wu, Lingen Chen and Fengrui Sun — 445 Optimization of steady flow heat pumps

Y. Makkawi, Y. Demirel and H. H. Al-Ali — 455 Numerical analysis of convection heat transfer in a rectangular packed duct with asymmetric heating

C. D. Rakopoulos and E. G. Giakoumis — 465 — Simulation and analysis of a naturally aspirated IDI diesel engine under transient conditions comprising the effect of various dynamic and thermodynamic parameters

Surendra Singh, Sarjinder Singh, J. P. Mittal and C. J. S. Pannu — 485 — Frontier energy use for the cultivation of wheat crop in Punjab

N. Harada and Kazumi Tsunoda — 493 — Study of a disk MHD generator for nonequilibrium plasma generator (NPG) system

Lin Wenxian, Gao Wenfeng, Pu Shaoxuan, Liu Tao and Lu Enrong — 505 — Correlations to estimate the monthly average daily diffuse radiation on horizontal surfaces in Yunnan Province, China

V. K. Sharma, M. Mincarini, F. Fortuna, F. Cognini and G. Cornacchia — 511 — Disposal of waste tyres for energy recovery and safe environment—review

M. Ishikawa and Meyer Steinberg — 529 — MHD power systems for reduction of CO_2 emission

M. Kinyanjui, N. Chaturvedi and S. M. Uppal — 541 — MHD Stokes problem for a vertical infinite plate in a dissipative rotating fluid with Hall current

Number 7

E. H. Amer, J. K. Nayak and G. K. Sharma — 549 — Transient method for testing flat-plate solar collectors

K. Al-Jamal and S. Khashan — 559 — Effect of energy extraction on solar pond performance

Yasuhiko H. Mori and Takaaki Mochizuki — 567 — Dissolution of liquid CO_2 into water at high pressures: a search for the mechanism of dissolution being retarded through hydrate-film formation

Chih Wu, Lingen Chen and Fengrui Sun — 579 — Effect of heat transfer law on finite-time exergoeconomic performance of Carnot heat pump

D. T. Hountalas and A. Anestis — 589 — Effect of pressure transducer position on measured cylinder pressure diagram of high speed diesel engines

Olympia Zogou and Anastassios Stamatelos — 609 — Effect of climatic conditions on the design optimization of heat pump systems for space heating and cooling

Joseph C. Lam — 623 — Climatic and economic influences on residential electricity consumption

M. A. Al-Nimr — 631 — Dynamic thermal behaviour of cooling towers

M. Bojić and B. Stojanović 637 MILP optimization of a CHP energy system

Lingen Chen, Chih Wu, Fengrui Sun and Shui Cao 643 Heat transfer effects on the net work output and efficiency characteristics for an air-standard Otto cycle

S. C. Tripathy, S. R. Lakshmi and R. Balasubramanian 649 Production costing and economic analysis of power systems containing wind energy conversion systems

P. J. Petit and J. P. Meyer 661 Techno-economic analysis between the performances of heat source air conditioners in South Africa

N. A. Mostafa and Yehia H. Magdy 671 Utilization of molasses and akalona hydrolyzate for continuous glycerol production in a packed bed bioreactor

J. P. Meyer and M. Tshimankinda 679 Domestic hot water consumption in South African townhouses

A. Demirbaş 685 Yields of oil products from thermochemical biomass conversion processes

Sangho Choi and Moncef Krarti 691 Heat transfer for slab-on-grade floor with stepped ground

Number 8

M. Lacroix and T. Duong 703 Experimental improvements of heat transfer in a latent heat thermal energy storage unit with embedded heat sources

T. Muneer and N. Abodahab 717 Frequency of condensation occurrence on double-glazing in the United Kingdom

Feng Wu, Lingen Chen, Chih Wu and Fengrui Sun 727 Optimum performance of irreversible Stirling engine with imperfect regeneration

F. Wu, L. Chen, F. Sun, C. Wu and Yonghong Zhu 733 Performance and optimization criteria for forward and reverse quantum Stirling cycles

G. Bisio and A. Bisio 741 Some thermodynamic remarks on photosynthetic energy conversion

Mircea Cârdu, Teodor Bara and Constantin Viorel Câmpian 749 Twenty-five years of safe exploitation of the hydropower plant "Iron Gates I" on the Danube River

Seyhan Uygur-Onbaşioğlu 757 Effect of interfacial drag terms on simulation of two phase flow distribution through narrow channels

Lingen Chen, Fengrui Sun, Ning Ni and Chih Wu 767 Optimal configuration of a class of two-heat-reservoir refrigeration cycles

W. He — 775 Dynamic model for molten carbonate fuel-cell power-generation systems

I. Inoue, J. T. Lineberry, M. Ishikawa and J. Umoto — 785 Numerical study of the electrodynamics behavior of the CDIF MHD generator

F. A. Hamad and M. K. Khan — 797 Natural convection heat transfer in horizontal and inclined annuli of different diameter ratios

Mohammed Mehdi Farid, Feras Ahmad Hamad and Mousa Abu-Arabi — 809 Melting and solidification in multi-dimensional geometry and presence of more than one interface

Mohammed Mehdi Farid, Feras Ahmad Hamad and Mousa Abu-Arabi — 819 Phase change cool storage using dimethyl-sulfoxide

Nadir Ahmed Elagib, Sharief Fadul Babiker and Shamsul Haque Alvi — 827 New empirical models for global solar radiation over Bahrain

M. Hussain and Ain-Ul Huda — 837 Measurement and model computation of hourly global radiation tilt factor for Dhaka

C. Tiris and M. Tiris — 843 Effect of collector orientation on solar energy availability

C. Tiris, M. Tiris, Y. Erdalli and M. Sohmen — 853 Experimental studies on a solar still coupled with a flat-plate collector and a single basin still

Number 9

U. Desideri and Roberto Corbelli — 857 CO_2 capture in small size cogeneration plants: technical and economical considerations

V. R. Rustamov, K. M. Abdullayev and E. A. Samedov — 869 Biomass conversion to liquid fuel by two-stage thermochemical cycle

C. Aprea and A. Greco — 877 An experimental evaluation of the greenhouse effect in R22 substitution

B. Yimer and K. Senthil — 889 Experimental and analytical phase change heat transfer

Sümer Şahin, Hüseyin Yapici and Ertuğrul Baltacioğlu — 899 Fusion breeder with enhanced safeguarding capabilities against nuclear weapon proliferation

Surendra Singh and C. J. S. Pannu — 911 Energy requirements in fish production in the State of Punjab

T. Matsuo, M. Ishikawa and J. Umoto — 915 Stability of open-cycle subsonic disk MHD generator

Y. P. YADAV and B. P. YADAV 927 Transient analytical solution of a solar still integrated with a tubular solar energy collector

M. G. RABBANI, J. B. X. DEVOTTA and S. ELANGOVAN 931 An adaptive fuzzy controlled superconducting magnetic energy storage unit for power systems

M. S. E. ABDO and G. H. SEDAHMED 943 A new technique for removing hexavalent chromium from waste water and energy generation via galvanic reduction with scrap iron

G. N. TIWARI, DUONG DUC HONG and R. K. GOYAL 953 A low cost solar water heater suitable for rural, as well as urban, areas of Vietnam

ADJAR PRATOTO, M. DAGUENET and B. ZEGHMATI 963 A simplified technique for sizing solar-assisted fixed-bed batch dryers: application to granulated natural rubber

Number 10

S. C. TRIPATHY 973 Digital governor for use in computer control of a generating unit

ATUL SHARMA and T. RAJESWARA RAO 985 Analysis of an annular finned pyrolyser

JINCAN CHEN and JAN A. SCHOUTEN 999 Optimum performance characteristics of an irreversible absorption refrigeration system

K. W. LINDLER 1009 Use of multi-stage cascades to improve performance of thermoelectric heat pumps

A. S. OLAWALE and S. S. ADEFILA 1015 Improved energy efficiency in absorption heat pump through process modification. Part I: Solvents for liquid–liquid extraction of ammonia–water mixture

A. S. OLAWALE and S. S. ADEFILA 1027 Improved energy efficiency in absorption heat pump through process modification. Part II: Thermodynamic potential of liquid–liquid extraction of ammonia–water mixtures

H. TENG and A. YAMASAKI 1045 Can CO_2 hydrate deposited in the ocean always reach the seabed?

A. S. FARAG, J. M. BAKHASHWAIN, A. AL-SHEHRI, T. C. CHENG and YUMING GAO 1053 Bundled conductor configuration optimization for compact transmission lines incorporating electromagnetic fields management

ABDUL-JABBAR N. KHALIFA and SALMAN S. AL-MUTAWALLI 1073 Effect of two-axis sun tracking on the performance of compound parabolic concentrators

K. R. Asfar and H. Hamed 1081 Combustion of fuel blends

Arshad Y. Khan and Jorge L. Martinez 1095 Modelling and parametric analysis of heat and mass transfer performance of a hybrid liquid desiccant absorber

T. M. Alkhamis, M. A. Alhusein and M. M. Kablan 1113 Utilization of waste heat from the kitchen furnace of an enclosed campus

Number 11

Anushree Bhatnagar, Manisha G. Dastidar and Pradip K. Roychoudhury 1121 Integrated technique for pyritic sulphur reduction in Indian (ASSAM) coal

S. M. Hasnain 1127 Review on sustainable thermal energy storage technologies, Part I: heat storage materials and techniques

S. M. Hasnain 1139 Review on sustainable thermal energy storage technologies, Part II: cool thermal storage

B. A/K. Abu-Hijleh, M. Mousa, R. Al-Dwairi, M. Al-Kumoos, and S. Al-Tarazi 1155 Feasibility study of a municipality solid waste incineration plant in Jordan

Feng Wu, Lingen Chen, Fengrui Sun, Chih Wu and Peiqun Hua 1161 Optimum performance parameters for a quantum Carnot heat pump with spin-1/2

R. Budin, A. Mihelić-Bogdanić and V. Filipan 1169 Solarized evaporation process

Tanusri Mandal and N. K. Mandal 1177 Biomethanation of some waste materials with pure metallic magnesium catalyst: improved biogas yields

Nobuhiko Hayanose, Yoshitaka Inui, Motoo Ishikawa and Juro Umoto 1181 Stability of open-cycle MHD generation system connected to power transmission line

M. Cârdu, and T. Bara 1193 Romanian achievement in hydro-power plants

M. Erzengin and M. M. Küçük 1203 Liquefaction of sunflower stalk by using supercritical extraction

B. A/K. Abu-Hijleh, R. Atallah, M. Mustafa, M. Al-Asker and L. El-Masoud 1207 Feasibility study of a combined electric power and water desalination plant in Jordan

Number 12

Haroun A. K. Shahad, Ali M. Farhan and Hussain A. Saleh	1215	Using date stone charcoal as a filtering medium for automobile exhaust gases
Massimo Dentice d'Accadia and Filippo de Rossi	1223	Thermoeconomic analysis and diagnosis of a refrigeration plant
Ahmet Z. Şahin	1233	Effect of viscosity on effectiveness of parallel flow heat exchanger
Witold Marańda, Gilbert De Mey and Alexis De Vos	1239	Optimization of the master–slave inverter system for grid–connected photovoltaic plants
S. C. Tripathy	1247	Transient stability analysis of multimachine power system using swallowtail catastrophe model
Jincan Chen	1255	Minimum power input of irreversible stirling refrigerator for given cooling rate
O. V. Ekechukwu and B. Norton	1265	Effects of seasonal weather variations on the measured performance of a natural-circulation solar-energy tropical crop dryer
X. K. Kakatsios, G. E. Houzouris and H. S. Giannakopoulou	1277	Accurate solutions and empirical relations for inviscid-diabatic and viscous-adiabatic one-dimensional flows of real steam
M. Al-Riahi, K. J. Al-Jumaily and H. Z. Ali	1289	Modeling clear weather day solar irradiance in Baghdad, Iraq
A. J. N. Khalifa and M. M. Mehdi	1295	On the verification of a hydrogen bubble flow meter used for monitoring flow rates in thermosyphon solar water heaters

Number 13

A. A. El-Sebaii	1303	Parametric study of a vertical solar still
A. Kanarachos and K. Geramanis	1317	Multivariable control of single zone hydronic heating systems with neural networks
S. A. Alajlan, M. S. Smiai and U. A. Elani	1337	Effective tools toward electrical energy conservation in Saudi Arabia
V. J. Daoo, N. S. Panchal, Faby Sunny, V. Sitaraman, and T. M. Krishnamoorthy	1351	Assessment of wind energy potential of Trombay, Mumbai (19.1°N; 72.8°E), India

C. K. W. NDIEMA, F. M. MPENDAZOE and A. WILLIAMS — 1357 — Emission of pollutants from a biomass stove

H. AL-HUSSAINI and K. O. SUEN — 1369 — Using shallow solar ponds as a heating source for greenhouses in cold climates

SURENDRA SINGH, SARJINDER SINGH, C. J. S. PANNU, and J. P. MITTAL — 1377 — Pre-harvest energy use and crop yield relationships for growing wheat in Punjab

ZHONGSHENG NIU and KAU-FUI V. WONG — 1383 — Adaptive simulation of boiler unit performance

R. TCHINDA, E. KAPTOUOM and D. NJOMO — 1395 — Study of the C.P.C. collector thermal behaviour

Number 14

SUN-SHING LU, KAU-FUI VINCENT WONG and LARRY STOFF — 1407 — Exergetic analysis of cooling systems with ozonation water treatment

STANISLAW SIENIUTYCZ and MICHAEL R. von SPAKOVSKY — 1423 — Finite time generalization of thermal exergy

A. K. AL-HAMADI, B. A. JUBRAN and G. THEODORIDIS — 1449 — Turbulence intensity effects on film cooling and heat transfer from compound angle holes with particular application to gas turbine blades

J. RICARDO MUÑOZ and DAVID J. SAILOR — 1459 — A modelling methodology for assessing the impact of climate variability and climatic change on hydroelectric generation

I. JETTÉ, M. ZAHEER-UDDIN and P. FAZIO — 1471 — PI-control of dual duct systems: manual tuning and control loop interaction

A. SATHEESH KUMAR, BHUMESH GUPTA, and D. P. TEWARI — 1483 — Arc model for slag coated electrodes

G. N. TIWARI, R. F. SUTAR, H. N. SINGH and R. K. GOYAL — 1497 — Performance studies of earth air tunnel cum greenhouse technology

Number 15

YOUSEF S. H. NAJJAR and MAHMOUD S. ZAAMOUT — 1503 — Performance analysis of compressed air energy storage (CAES) plant for dry regions

A. STEINFELD and I. SPIEWAK — 1513 — Economic evaluation of the solar thermal coproduction of zinc and synthesis gas

M. Arulanantham, K. S. Reddy and N. D. Kaushika — 1519 — Solar gain characteristics of absorber-parallel transparent insulation materials

L. Royon, P. Perrot, G. Guiffant and S. Fraoua — 1529 — Physical properties and thermorheological behaviour of a dispersion having cold latent heat-storage material

Yasuhiko H. Mori — 1537 — Clathrate hydrate formation at the interface between liquid CO_2 and water phases—a review of rival models characterizing "hydrate films"

Esam H. Ismail and Ahmad J. Sebzali — 1559 — A new class of quasi-square-wave resonant converters with ZCS

Esam H. Ismail and Carlos Oliveira — 1571 — A family of ZVS-CV low harmonic rectifiers

Luis Robledo and Alfonso Soler — 1585 — Dependence on surface orientation of coefficients in the circumsolar simplified Perez illuminance model for vertical planes at Madrid

Abdul-Jabbar N. Khalifa — 1597 — A study on a passively heated single-zone building using a thermal storage wall

Xiao Feng, Yi-Nian Cai and Li-Lun Qian — 1607 — A new performance criterion for cogeneration system

Arun K. Tripathi, P. V. R. Iyer, Tara Chandra Kandpal and K. K. Singh — 1611 — Assessment of availability and costs of some agricultural residues used as feedstocks for biomass gasification and briquetting in India

Numbers 16–18

FLOWERS '97
FLOrence World Energy Research Symposium 1997

1619 Foreword

Advanced cycles

J. H. Horlock — 1621 — Heat exchanger performance with water injection (with relevance to evaporative gas turbine (EGT) cycles)

M. Utamura, I. Takehara and H. Karasawa — 1631 — MAT, a novel, open cycle gas turbine for power augmentation

Daniele Fiaschi and Giampaolo Manfrida — 1643 — Exergy analysis of the semi-closed gas turbine combined cycle (SCGT/CC)

Olav Bolland and Philippe Mathieu — 1653 — Comparison of two CO2 removal options in combined cycle power plants

I. L. Leites 1665 Thermodynamics of CO2 solubility in mixtures monoethanolamine with organic solvents and water and commercial experience of energy saving gas purification technology

C. Dejfors, E. Thorin and G. Svedberg 1675 Ammonia–water power cycles for direct-fired co-generation applications

S. M. Camporeale and B. Fortunato 1683 Performance of a mixed gas–steam cycle power plant obtained upgrading an aero-derivative gas turbine

C. Carcasci, B. Facchini and S. Harvey 1693 Modular approach to analysis of chemically recuperated gas turbine cycles

General thermodynamics

Adrian Bejan 1705 Constructal theory: from thermodynamic and geometric optimization to predicting shape in nature

Willem van Gool 1719 Thermodynamics of chemical references for exergy analysis

J. de Ruyck 1729 Composite curve theory with inclusion of chemical reactions

Stanislaw Sieniutycz 1735 Generalized Carnot problem of maximum work in finite time via Hamilton–Jacobi–Bellman theory

Thermoeconomics, process integration and heat transfer

F. Bošnjaković and K.-F. Knoche 1745 Pinch analysis for cooling towers

M. Costea and M. Feidt 1753 The effect of the overall heat transfer coefficient variation on the optimal distribution of the heat transfer surface conductance or area in a Stirling engine

Zygmunt Kolenda, Teresa Styrylska, Janusz Donizak and Artur Guzik 1763 Numerical and experimental mathematical modelling of heat and mass transfer processes using unified least squares method

Eduardo Rafael Barreda del Campo, Sérgio Augusto Araújo da Gama Cerqueira and Silvia Azucena Nebra 1773 Thermoeconomic analysis of a Cuban sugar cane mill

A. Doldersum 1781 Exergy analysis proves viability of process modifications

Energy management and cogeneration: industrial processes

Riad Benelmir and Michel Feidt 1791 Energy cogeneration systems and energy management strategy

Vladimir Stepanov and Sergey Stepanov 1803 Energy use efficiency of metallurgical processes

T. Gemci and A. Öztürk 1811 Exergy analysis of a sulphide-pulp preparation process in the pulp and paper industry

R. L. Cornelissen and G. G. Hirs 1821 Exergy analysis of cryogenic air separation

Giuseppe Grazzini and Alessio Mariani 1827 A simple program to design a multi-stage jet-pump for refrigeration cycles

E. Mozes, R. L. Cornelissen, G. G. Hirs and R. M. Boom 1835 Exergy analysis of the conventional textile washing process

E. A. Torres and W. L. R. Gallo 1845 Exergetic evaluation of a cogeneration system in a petrochemical complex

Vittorio Bruzzi, Marcello Colaianni and Luciano Zanderighi 1853 Energy savings in chemical plants: a vinyl chloride case history

M. Sorin, J.-C. Bonhivers and J. Paris 1863 Exergy efficiency and conversion of chemical reactions

Marco Beccali, Maurizio Cellura and Davide Ardente 1869 Decision making in energy planning: the ELECTRE multicriteria analysis approach compared to a FUZZY-SETS methodology

Coal and solid fuels

S. Postrzednik 1883 Progress and energy effects of weathering and degassing of solid fuels

Mustafa Özdemir and Jacek Żelkowski 1891 New application of the fixed bed reactor to the measurement of coal reactivity under dynamic combustion conductions

Andréa Paula Ottoboni, Itamar de Souza, Genésio José Menon and Rogério José da Silva 1899 Efficiency of destruction of waste used in the co-incineration in the rotary kilns

Renewables

Alejandro Zaleta-Aguilar, Lidia Ranz and Antonio Valero 1911 Towards a unified measure of renewable resources availability: the exergy method applied to the water of a river

R. Curran, T. J. T. Whittaker and T. P. Stewart 1919 Aerodynamic conversion of ocean power from wave to wire

Kirill V. Lobachyov and Horst J. Richter 1931 An advanced integrated biomass gasification and molten fuel cell power system

GIANNI BIDINI, UMBERTO DESIDERI, FRANCESCO DI MARIA, ALDO BALDACCI, RENATO PAPALE and FABIO SABATELLI — 1945 — Optimization of an integrated gas turbine–geothermal power plant

Combustion and environmental issues

R. WILK and A. SZLĘK — 1957 — A method of NOx reduction during the combustion of oil

MARIE ANHEDEN and GUNNAR SVEDBERG — 1967 — Exergy analysis of chemical-looping combustion systems

M. A. A. NAZHA, H. RAJAKARUNA and R. J. CROOKES — 1981 — Soot and gaseous species formation in a water-in-liquid fuel emulsion spray—a mathematical approach

H. BRAUN, A. HOEREN, T. SCHNEIDERS, K. VORTMEYER and H. PFOST — 1991 — Measurement of the mixing quality in premix combustors

A. HENHAM and M. K. MAKKAR — 2001 — Combustion of simulated biogas in a dual-fuel diesel engine